



# MUNICIPAL VULNERABILITY PREPAREDNESS

## Community Resilience Building on Nantucket

JANUARY 8, 2019

PHOTO: BOBAK HA'ERI, AUGUST 2004



MILONE & MACBROOM







# WELCOME & INTRODUCTIONS





# OVERVIEW PRESENTATION ON WORKSHOP



# AGENDA

Time	ACTIVITIES and OBJECTIVES
8:30	Registration
9:00	Welcome and Introductions
9:20	Overview Presentation on Workshop
9:30	Overview Presentation on Science and Resources
9:50	Small Team Exercise
10:45	BREAK
11:00	Small Team Exercise, Continued
12:30	LUNCH (provided on-site)
1:30	Small Team Exercise, Continued
2:00	Report Outs
2:30	Top Priorities
3:30	Wrap up and Next Steps
4:00	Adjourn



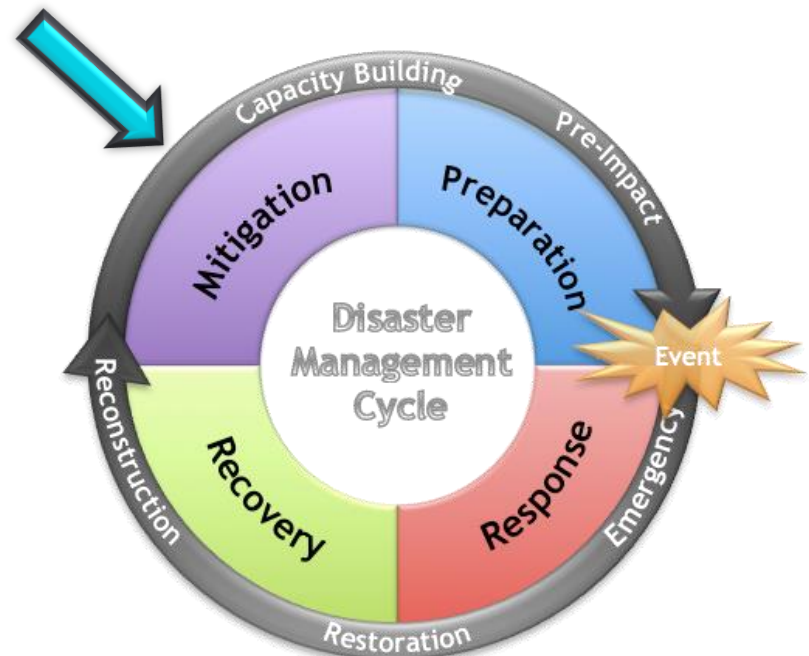
# WORKSHOP OVERVIEW

## OTHER PLANNING EFFORTS



## Hazard Mitigation Plan

- All Natural Hazards
- Regulatory Document
- Affects Flood Insurance
- Positions for Mitigation Grants
- Limitations
  - 5-year planning window
  - Focus on loss reduction
  - Highly prescribed
  - Backward-looking
- Currently Under FEMA Review



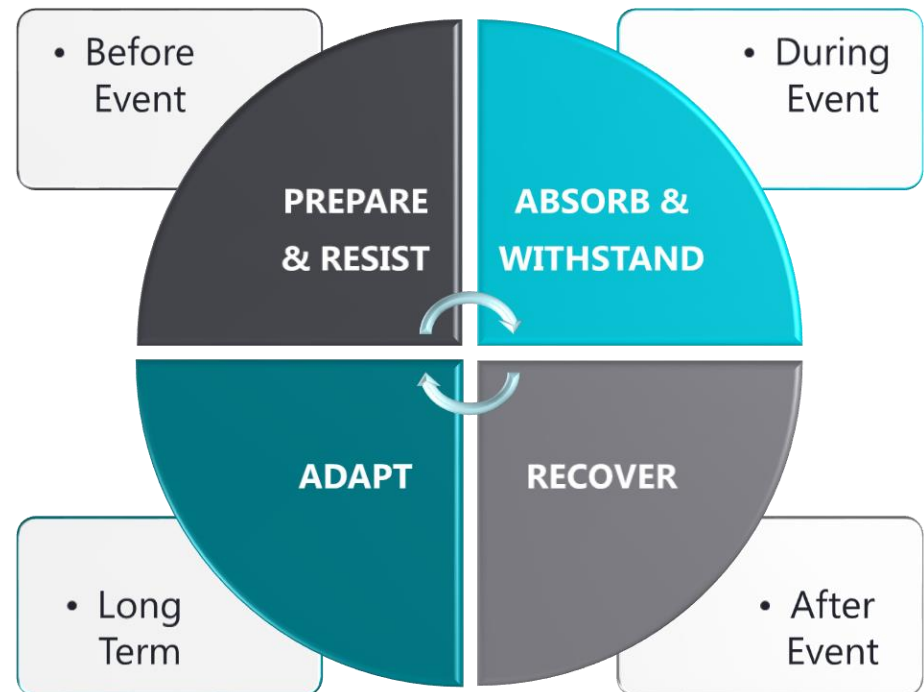


# WORKSHOP OVERVIEW

## OTHER PLANNING EFFORTS

### Coastal Resilience Plan

- Coastal Hazards
  - (flood, wind, erosion)
- Community-wide Vision
- Positions for Various Funding
- Strengths
  - Focus on resilience
  - Long-term planning window
  - Comprehensive
  - Cross-sector/interdisciplinary
  - Forward-looking
  - Flexible content & format
- Currently in-process





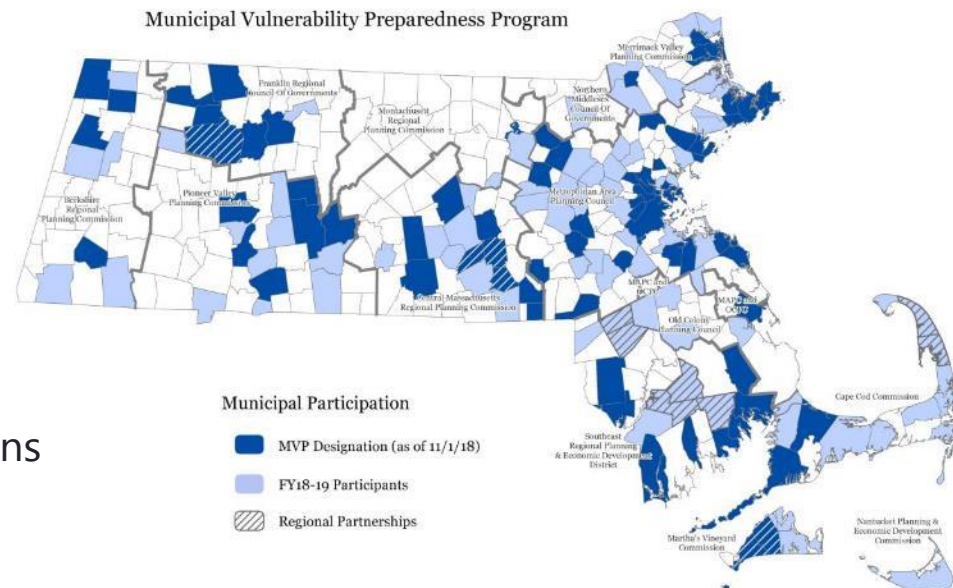
# WORKSHOP OVERVIEW

## MUNICIPAL VULNERABILITY PREPAREDNESS

- Massachusetts Commonwealth-Wide
- Community Resilience Building Approach
  - Stakeholder-Developed Priorities
  - Develop Relationships and Support
  - Process is Part of the Goal

UTILIZE  
PARTNERSHIPS &  
LEVERAGE EXISTING  
STRENGTHS

- Two Opportunities
  - MVP Planning Grant
    - Stakeholder Workshop
    - Public Listening Session
    - Identification of Top Actions
  - MVP Action Plan
    - Implementation of Top Actions
    - Must be MVP Certified
- Other Benefits
  - MVP Communities get Priority for State Funding (future plan)



MILONE & MACBROOM



# WORKSHOP OVERVIEW

## COMMUNITY RESILIENCE

### What is Resilience?

- Capacity to establish a positive trajectory after a disturbance or event
- Resist (prepare), Absorb, Recover, Adapt

$$\text{Risk} = \text{Vulnerability} \times \text{Frequency}$$

Vulnerability: how susceptible to loss or damage?

Frequency: how often does the event happen?

### Minimize Vulnerabilities Capitalize on Strengths

- Infrastructure
- Social Capital
- Natural Environment



- Economic Environment
- Historic Resources
- The Nantucket Experience



MILONE & MACBROOM



# WORKSHOP OVERVIEW

## NANTUCKET CRB WORKSHOP

- **Goals:**

- Dialogue, Understanding, and Collaboration
- Stakeholder Supported Mitigation Actions
- Integration with HMP and CRP

- **Objectives:**

- Characterize Primary Hazards
- Identify Strengths and Vulnerabilities
- Agree on Priority Actions



MILONE & MACBROOM





# OVERVIEW PRESENTATION ON SCIENCE AND RESOURCES



# RISKS AND HAZARDS ON NANTUCKET

## EXTREME EVENTS & CLIMATE CHANGE

### KEY HAZARDS



**Rising  
Temperature**



**Increased  
Drought**



**Less Snow  
and More  
Rain**



**Potential for  
More Large  
Storms**



**Sea Level  
Rise &  
Erosion**



# CONTEXT: RISKS AND HAZARDS FOR NANTUCKET

## Average and Extreme Temperatures

- Public Health
- Infrastructure
- Agriculture and Aquaculture
- Wildfire Risk
- Rain vs Snow
- Water Quality





# CONTEXT: RISKS AND HAZARDS FOR NANTUCKET

## Changing Precipitation Patterns

- Totals & Magnitude
- Drought Frequency & Severity
- Wildfire Risk
- Ecosystem Impacts
- Agriculture Impacts
- Water Quality





# CONTEXT: RISKS AND HAZARDS FOR NANTUCKET

## Sea Level Rise

- Coastal Flooding & Erosion
- Saltwater Intrusion
- Infrastructure Impacts
- Ecosystem Impacts
- Aquaculture Impacts





# RISKS AND HAZARDS ON NANTUCKET

## CLIMATE CHANGE



resilient **MA**

Climate Change Clearinghouse for the Commonwealth

## OBSERVATIONS & PROJECTIONS

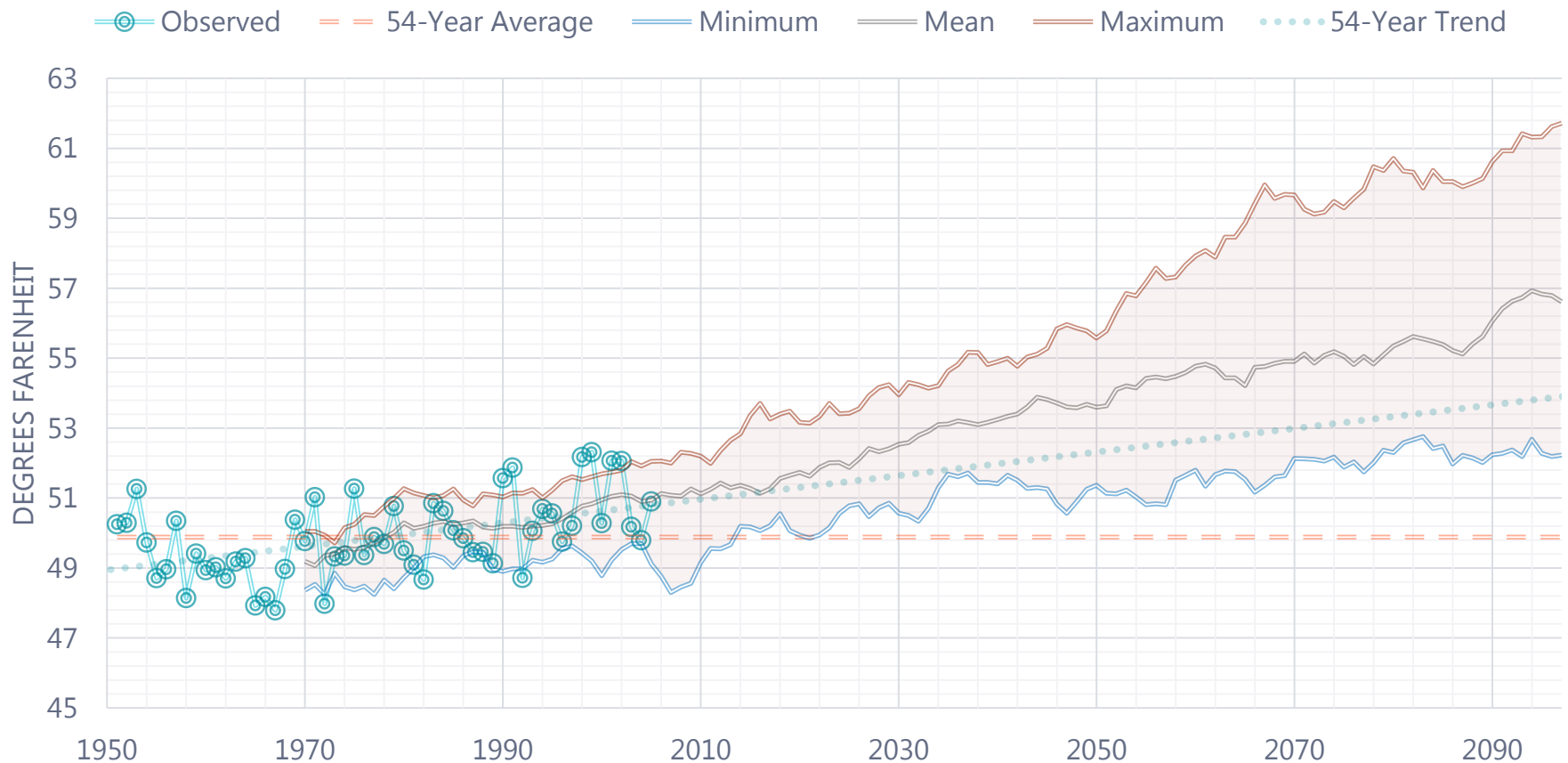
- Clearinghouse for Massachusetts Climate Data
- Consistent Data for Region
- “Downscaled” from Global Projections



# RESOURCES AVAILABLE FOR NANTUCKET



## Projected Average Annual Temperature, Nantucket

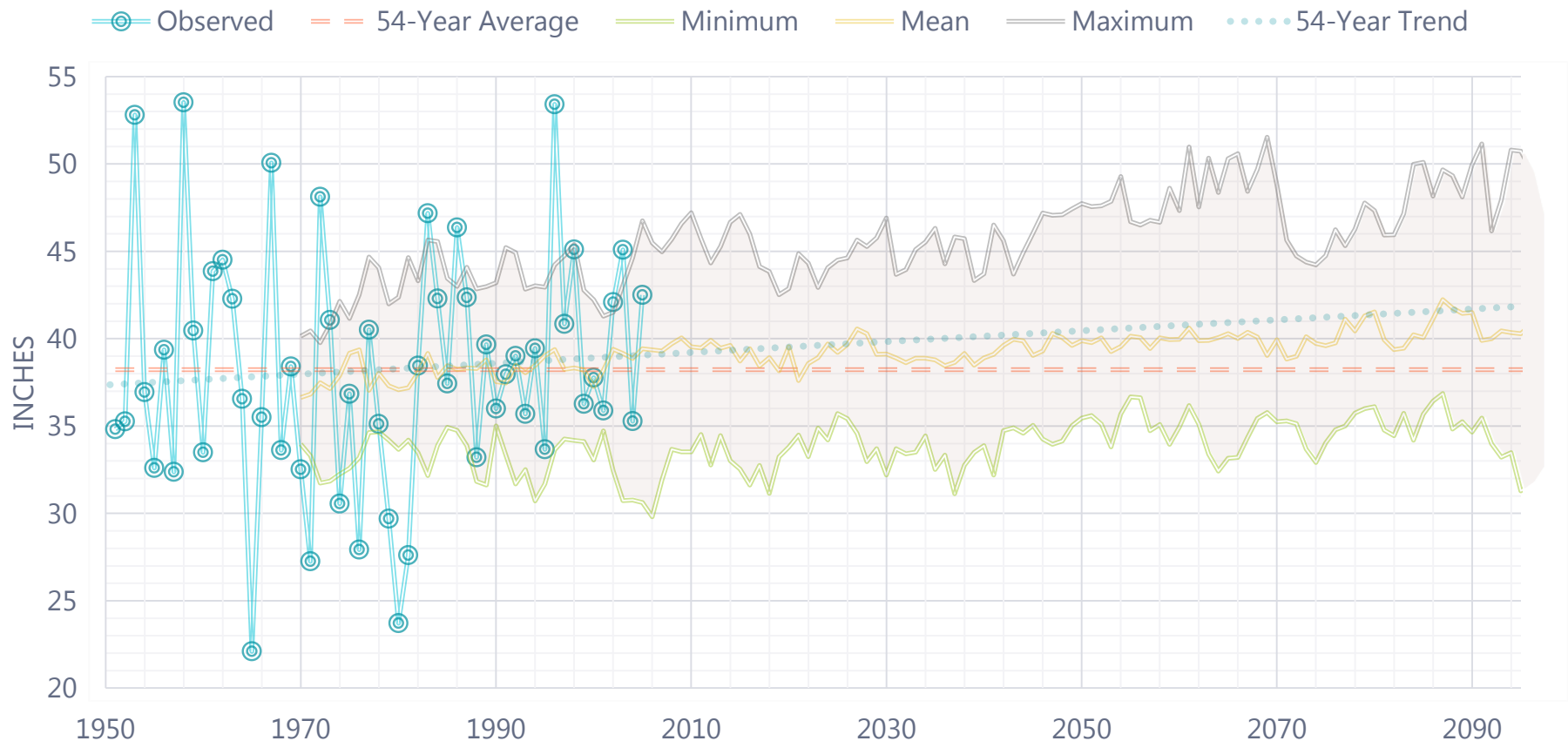




# RESOURCES AVAILABLE FOR NANTUCKET



## Projected Annual Precipitation, Nantucket

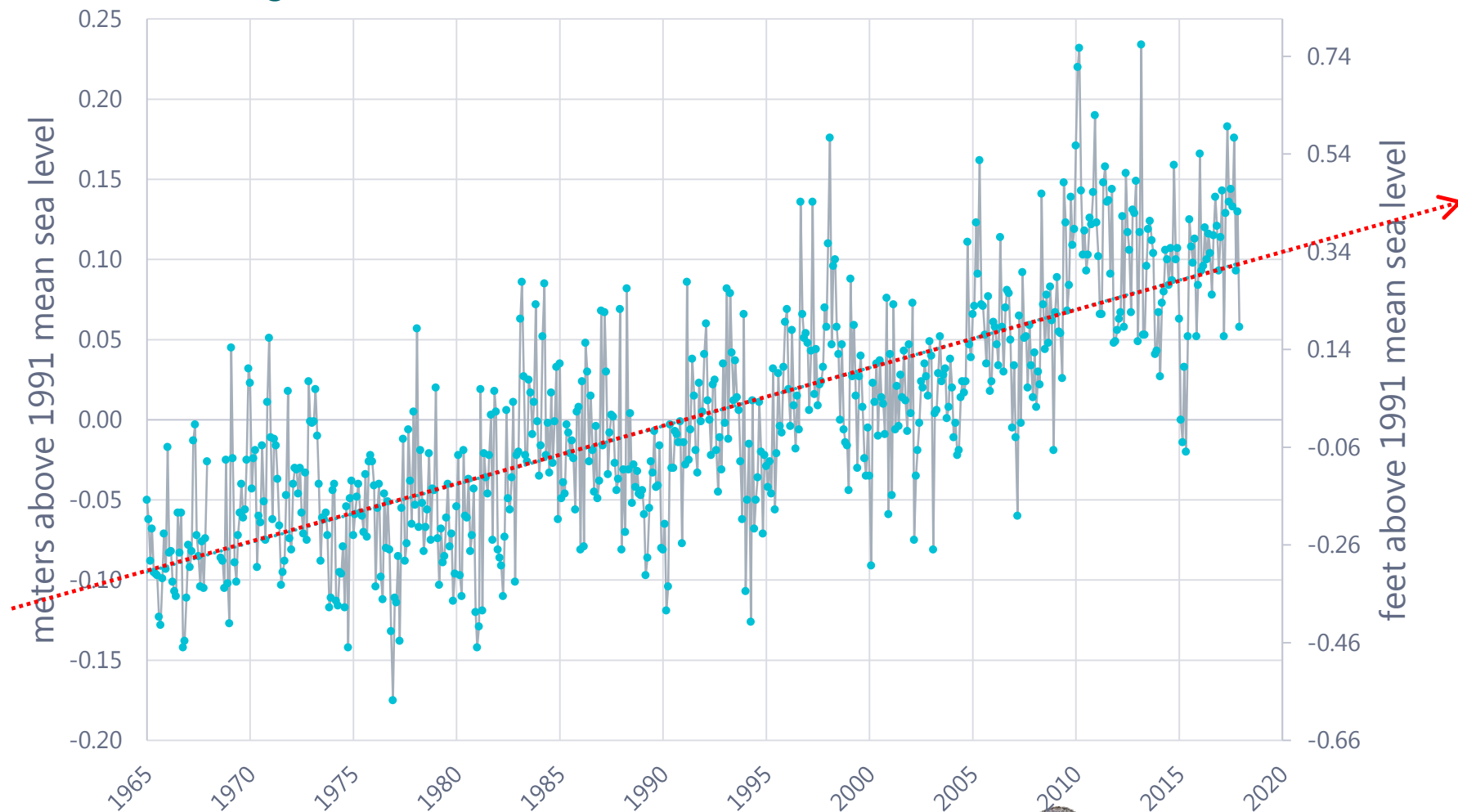




# RESOURCES AVAILABLE FOR NANTUCKET



NOAA Tide Gauge 8449130. Nantucket Harbor, 1965 – 2017 (Relative to 1991 mean sea level)



MILONE & MACBROOM

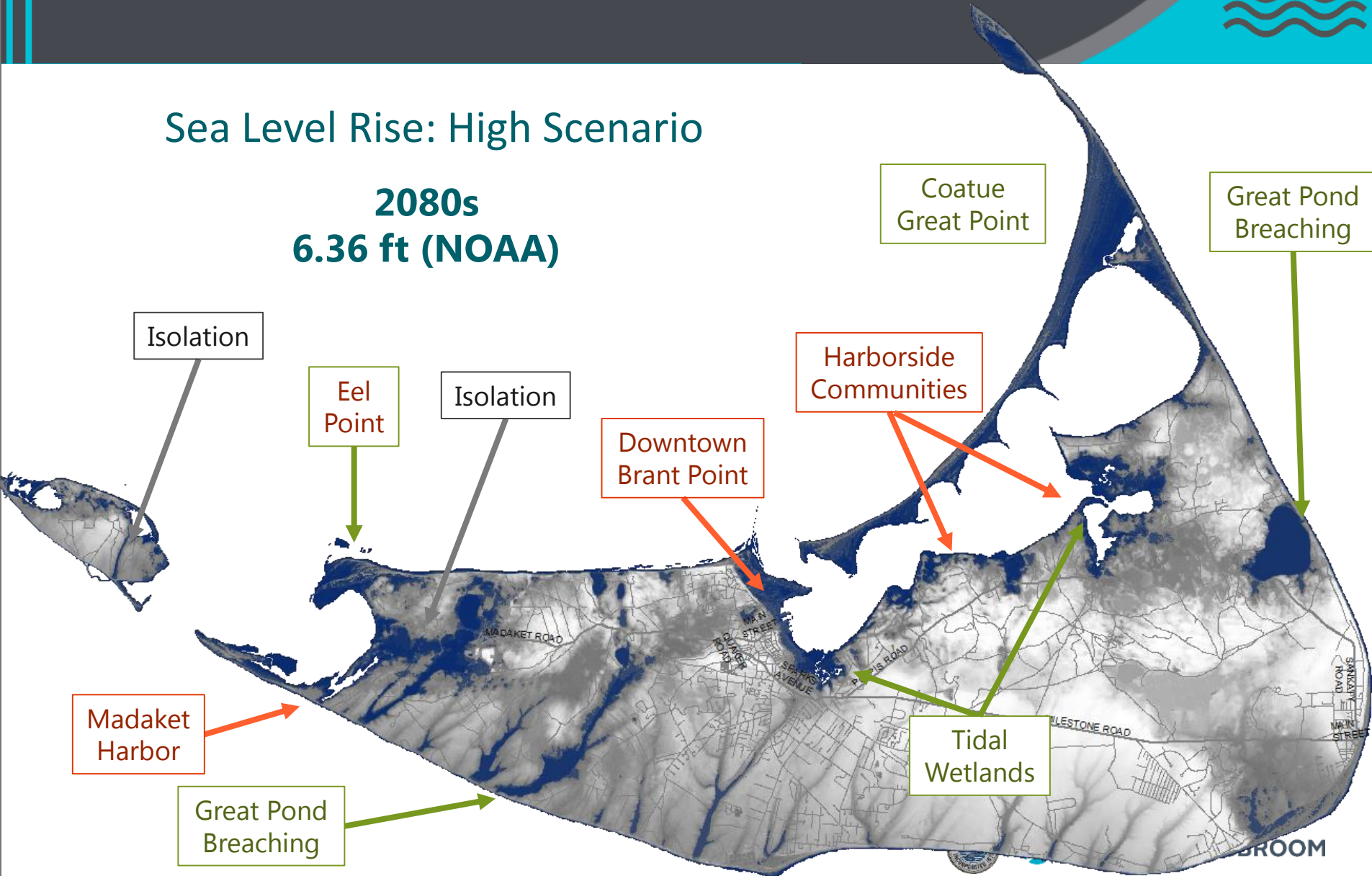


# RESOURCES AVAILABLE FOR NANTUCKET



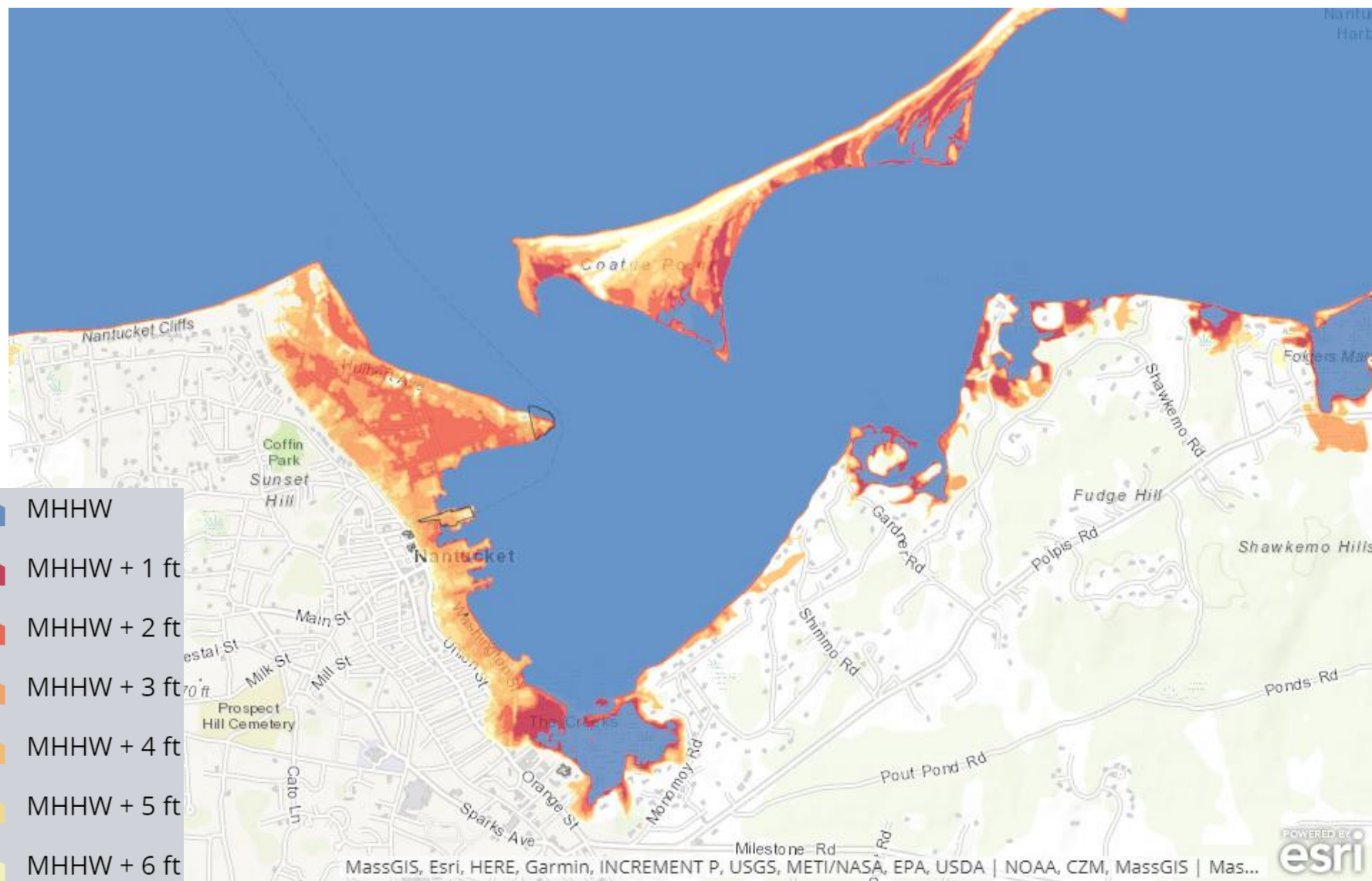
## Sea Level Rise: High Scenario

**2080s**  
**6.36 ft (NOAA)**



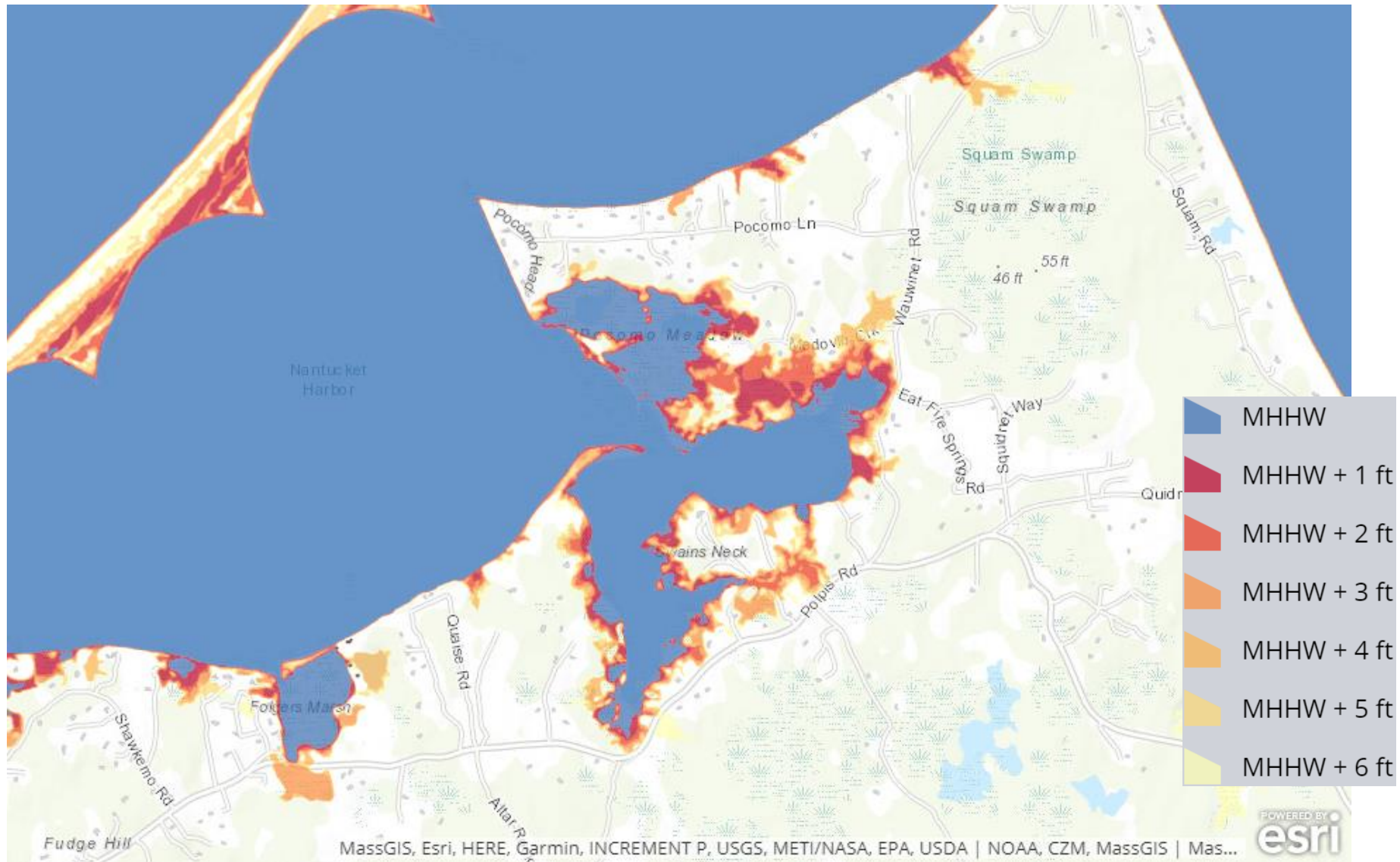


# RESOURCES AVAILABLE FOR NANTUCKET



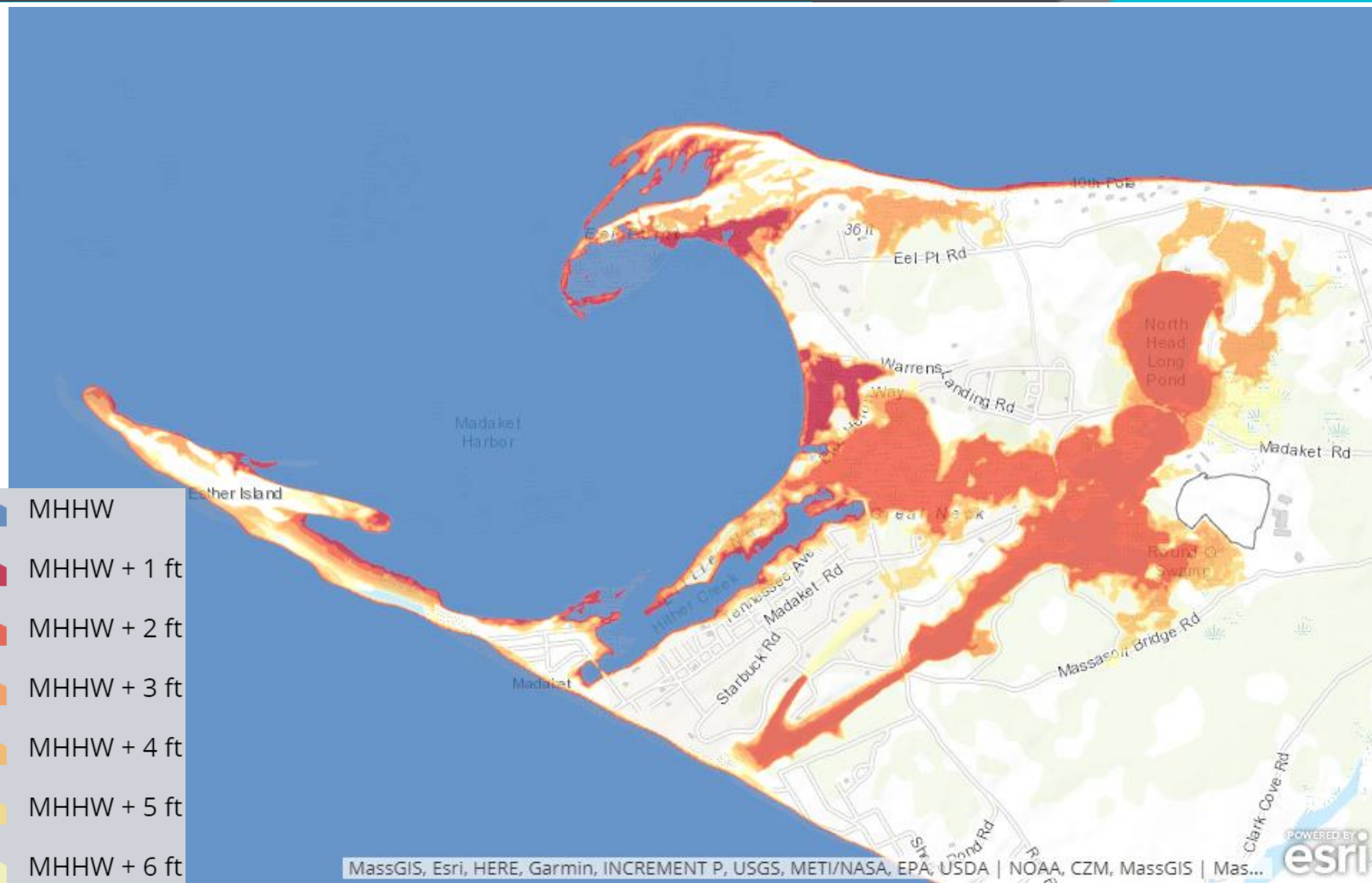


# RESOURCES AVAILABLE FOR NANTUCKET





# RESOURCES AVAILABLE FOR NANTUCKET

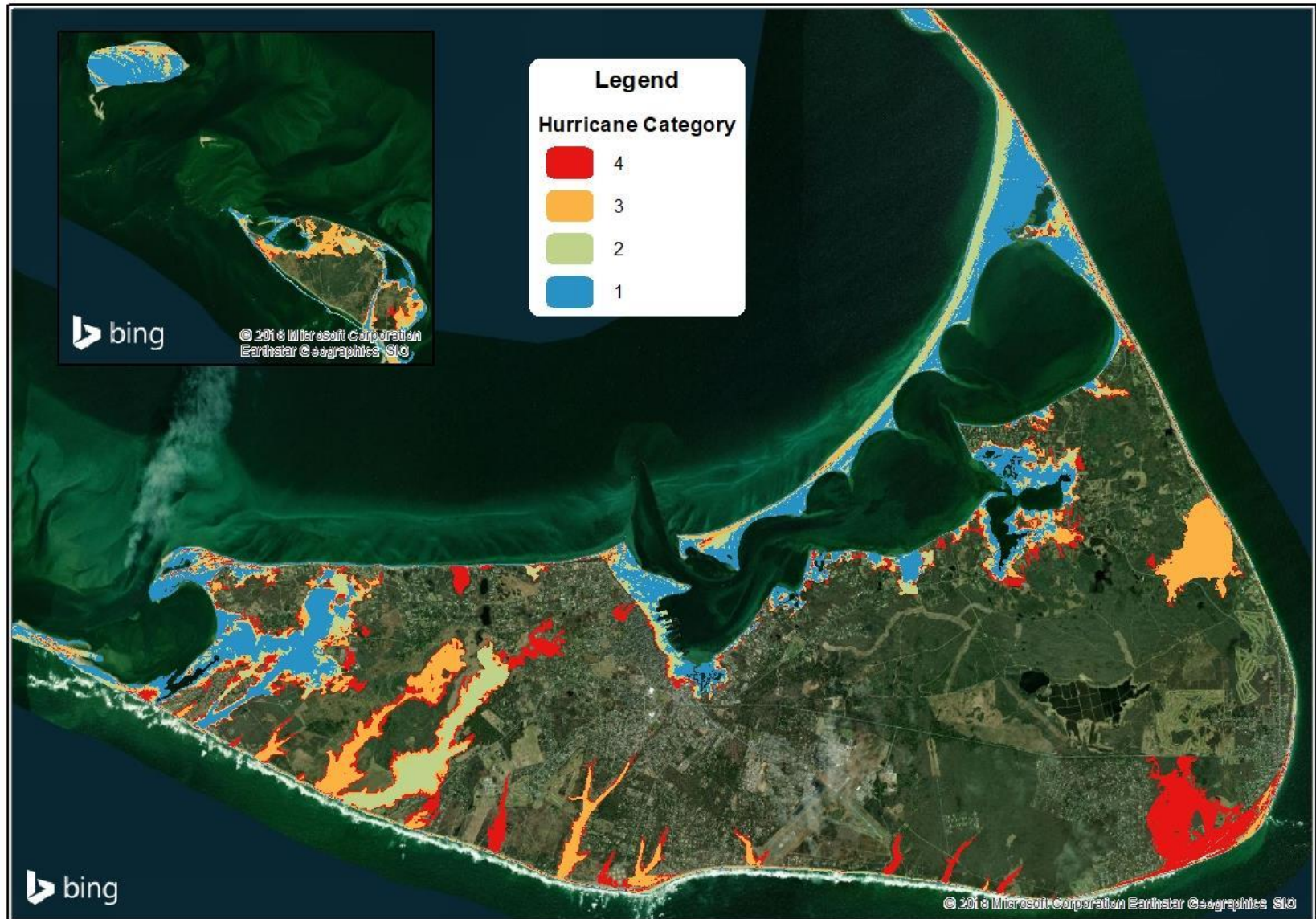




# RESOURCES AVAILABLE FOR NANTUCKET



<https://nantucketma.mapgeo.io>





# RESOURCES AVAILABLE FOR NANTUCKET

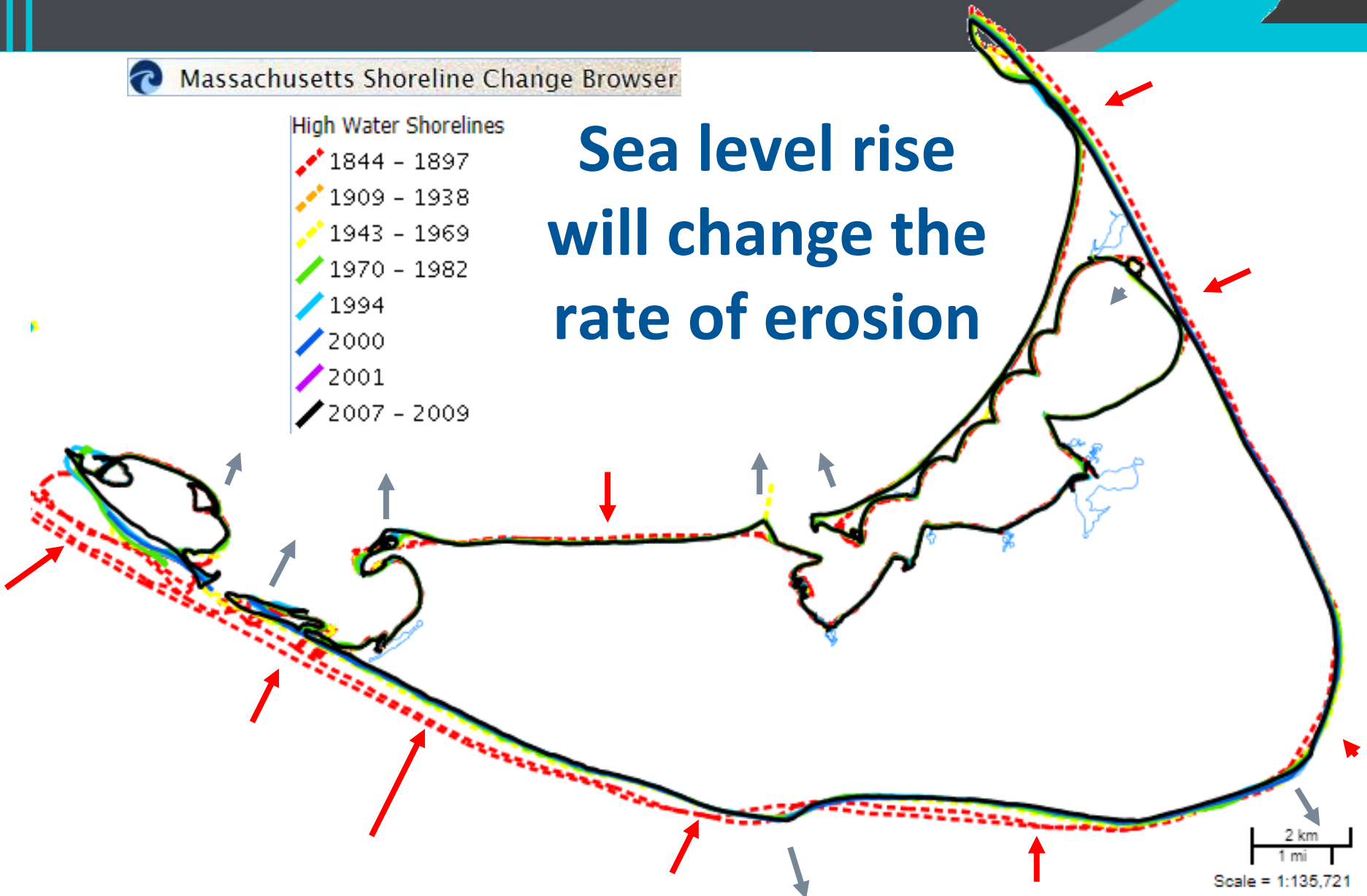


Massachusetts Shoreline Change Browser

## High Water Shorelines

- 1844 - 1897
- 1909 - 1938
- 1943 - 1969
- 1970 - 1982
- 1994
- 2000
- 2001
- 2007 - 2009

**Sea level rise  
will change the  
rate of erosion**







# **OVERVIEW PRESENTATION ON COMMUNITY RESILIENCE BUILDING**



---

# Community Resilience Building WORKSHOP GUIDE



**[www.CommunityResilienceBuilding.org](http://www.CommunityResilienceBuilding.org)**



# Process...



- Current and future hazards?
- What are our strengths & vulnerabilities?
- What can we do about it?



# Community Resilience Building

**Hazards**

**Infrastructure**

**Societal**

**Environmental**







Hazards





# Infrastructure Vulnerability/Strength



# Infrastructure

- **What infrastructure/facilities are exposed?**
  - *WWT, nursing homes, schools, hazardous materials, etc...*
- **What makes this infrastructure vulnerable?**
  - *Location, age, building codes, type of housing, etc...*
- **Consequences of this infrastructure vulnerability?**
  - *Lack of access to critical facilities – urgency care, pharmacies*

## ***POSSIBLE ACTIONS: What can be done?***

- *Assess housing stock in vulnerable areas?*
- *Prioritize future development in lower-risk areas?*
- *Integrate risks into capital improvement plans?*



PHOTO: HURRICANE SANDY JASON GRAZIADEI



**Societal Vulnerability/Strengths**



# Societal

- **Population characteristics in high-risk areas?**
  - *Elderly, low income, special needs, etc...*
- **How will hazards intensify these characteristics?**
  - *Where are areas for improvement in the community?*
- **Strengths of your community?**
  - *Active civic groups, organizations, associations?*

## **POSSIBLE ACTIONS: What can be done?**

- *Improve existing programs (which ones)?*
- *Increase awareness via education/outreach on hazards?*
- *Increase involvement by citizens (on what and with whom)?*





# Environmental Vulnerability/Strengths



# Environmental

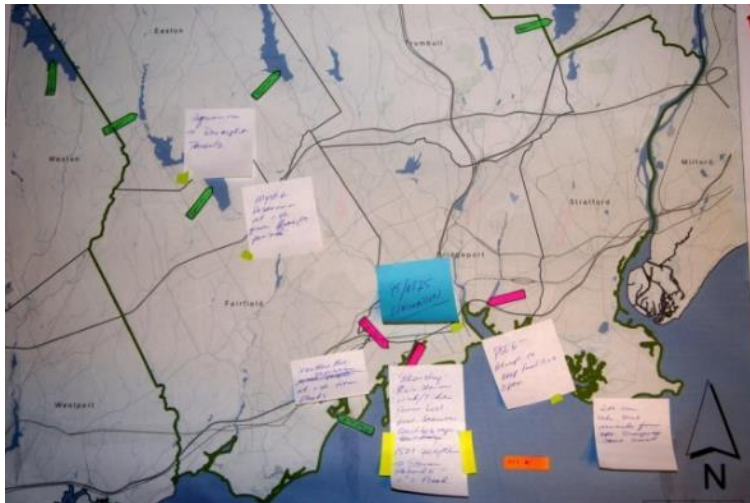
- **Natural resources important to your community and where?**
- **Benefits natural resources provide and where?**
  - *Storm buffering, flood protection, erosion control, water quality, recreation, etc...*
- **High risk areas and effects of hazards?**
  - *Impact without and with more natural resources*

## **POSSIBLE ACTIONS: What can be done?**

- *Conserve land located adjacent to flood zones?*
- *Green infrastructure in neighborhoods?*
- *Increase habitat restoration?*



## Base Map Example





# Introduce Today's Activities

## Elements

- Participatory process for assessing a community's vulnerability/strengths and priority actions
- Risk Matrix and Base Maps

## Process and outputs:

- Exercise
- Complete assessment using Risk Matrix/Base Maps
- Discuss summary



# Risk Matrix/Base Map

## Step #1: List top hazards

## Step #2: Vulnerabilities and Strengths

- Infrastructure; Societal; Ecosystem
  - Indicate location and ownership

## Step #3: Mark your Base Maps

## Step #4: Develop actions

- For each action;
  - **Rank Priority** (High (H), Medium (M) or Low (L))
  - **Urgency** (On-going (O), Short (S) or Long-term (L)).



# Report outs

- Each Team reports out on its priority hazards, vulnerabilities, strengths, and Actions.
- Discuss top Actions



# Expectations of Participants

- Permission to be active participants
- Your ideas & expertise are needed
- Respect contributions of others
- Be creative and remain optimistic
- Stay on task (as defined by your facilitators)
- Be accountable for your group's discussions



# Your Turn!





# NEXT STEPS



# NEXT STEPS



Workshop Results Report



Public Listening Session

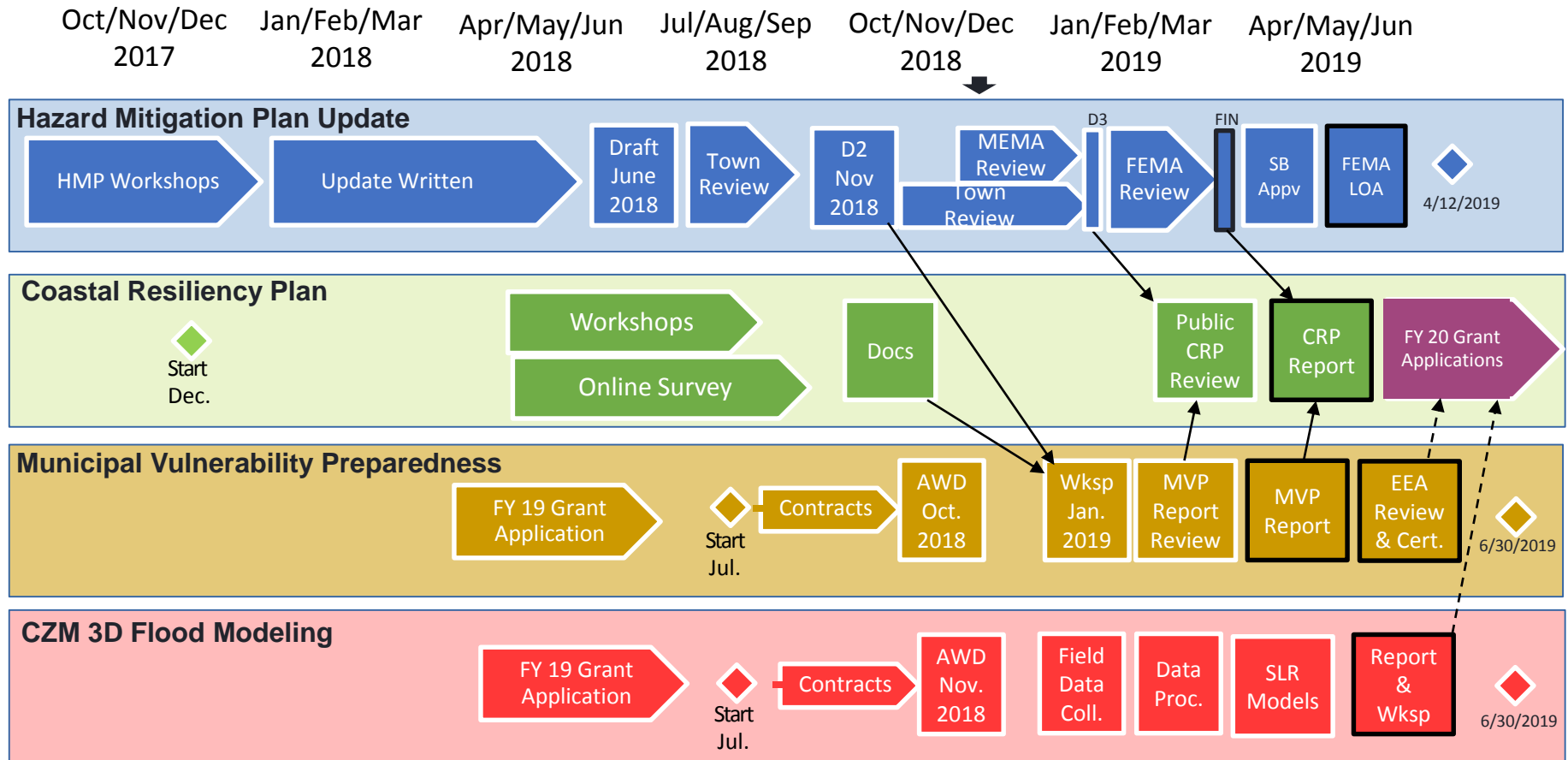


MVP Certification and Funding Opportunities



MILONE & MACBROOM





Hazard Mitigation and Coastal Resiliency Project Schedule and Progress Report



# WRAP UP



PHOTO: NANTUCKET, MA



MILONE & MACBROOM





# MUNICIPAL VULNERABILITY PREPAREDNESS

## Community Resilience Building on Nantucket

JANUARY 8, 2019

PHOTO: BOBAK HA'ERI, AUGUST 2004



MILONE & MACBROOM

